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(54) Title: OXYGENATING AGENTS FOR ENHANCING HOST RESPONSES TO MICROBIAL INFECTIONS

(57) Abstract: Oxygenating agents are used in the present invention for the novel purpose of treating microbial infections. The invention takes advantage of the fact that the increase in tissue pO<sub>2</sub> produced thereby can enhance the efficacy of the body's own antimicrobial defenses (including tissue repair), while also improving the efficacy of adjunctive agents that may be co-administered, such as antimicrobial agents, antioxidants, cytokine modulators, endotoxin antagonists and growth factors. The oxygenating agents of the present invention achieve the desired increased pO<sub>2</sub> in the tissues without having to resort to the risks and expenses of hyperbaric oxygen therapy (HBO). The oxygenating agents can be administered systemically, regionally, or topically.

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 03/09226

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61K45/00 A61K31/02 A61K33/00 A61P31/00 A61P31/04

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61K A61P

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, MEDLINE, EMBASE, BIOSIS, CHEM ABS Data, SCISEARCH

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 34 38 966 A (OXO CHEMIE GMBH) 24 April 1986 (1986-04-24) page 4, line 16 - line 32 page 6, line 10 - line 16 -----	1-5, 11-58
X	WO 92/02242 A (UNIV ROCKEFELLER) 20 February 1992 (1992-02-20) page 6, line 10 - line 13; claim 1 -----	1-5, 11-58
X	D HOBSON ET AL: "The anti-bacterial activity of hemoglobin" THE JOURNAL OF EXPERIMENTAL MEDICINE, vol. 107, no. 2, 1 February 1958 (1958-02-01), pages 167-183, XP000983923 summary table IX ----- -/--	1-5, 11-58

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*Z\* document member of the same patent family

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21 October 2003

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19.02.2004

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## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 03/09226

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	D C WOOD ET AL: "Hemoglobin and related compounds as antibacterial agents" LABORAT. INVEST., vol. 7, no. 1, January 1958 (1958-01), - February 1958 (1958-02) pages 1-8, XP000984630 summary -----	1-5, 11-58
X	DE 25 23 052 A (DOCKNER TONI DR) 2 December 1976 (1976-12-02) claim 1 -----	1-5, 11-58
X	PARFITT K (ED): "Martindale; The complete drug reference (32nd Edition)" PHARMACEUTICAL PRESS, TAUNTON, MASSACHUSETTS, US, XP002257542 page 1116 - page 1117 page 1123 see "hydrogen peroxide" and "potassium permanganate" -----	1,11-58

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US 03/09226

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

2 to 5 and claims 1, 11 to 58 in part

### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 2 to 5 and Claims 1, 11 to 58 in part

methods of treating a microbial infection by administering a  
a HAEM based product  
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2. claims: 6, 7 and Claims 1, 11 to 58 in part

methods of treating a microbial infection by administering a  
PERFLUOROCARBON  
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3. claims: 8 and Claims 1, 11 to 58 in part

methods of treating a microbial infection by administering  
AQUEOUS OXYGEN  
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4. claims: 1, 10 to 58 in part

methods of treating a microbial infection by administering  
HYDROGEN PEROXIDE  
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5. claims: 1, 10 to 58 in part

methods of treating a microbial infection by administering  
TETRACHLORODECAOXIDE  
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6. claims: 1, 10 to 58 in part

methods of treating a microbial infection by administering  
OZONE  
---

7. claims: 1, 10 to 58 in part

methods of treating a microbial infection by administering  
POTASSIUM PERMANGANATE  
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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 03/09226

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 3438966	A	24-04-1986	DE 3438966 A1	24-04-1986
WO 9202242	A	20-02-1992	AU 645131 B2	06-01-1994
			AU 8410491 A	02-03-1992
			CA 2088593 A1	01-02-1992
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			WO 9202242 A1	20-02-1992
DE 2523052	A	02-12-1976	DE 2523052 A1	02-12-1976